

## Surface treatment of titanium or titanium base alloy

Publication number: US3085949

Publication date: 1963-04-16

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Classification:

- international: C23C28/00; C23G5/00; C25D5/38; C23C28/00;  
C23G5/00; C25D5/34;

- European: C23C28/00; C23G5/00; C25D5/38

Application number: US19600018884 19600331

Priority number(s): GB19590013185 19590417

Also published as:



GB871941 (A)

ES257297 (A1)

CH390655 (A)

DE1196470 (B1)

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Abstract not available for US3085949

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## 3,085,949 SURFACE TREATMENT OF TITANIUM OR TITANIUM BASE ALLOY

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land, assignors to Imperial Chemical Industries Limited,  
London, England, a corporation of Great Britain  
No Drawing. Filed Mar. 31, 1960, Ser. No. 18,884  
Claims priority, application Great Britain Apr. 17, 1959  
5 Claims. (Cl. 204-29)

The present invention relates to improvements in or  
relating to the surface treatment of titanium or titanium  
base alloy articles for the purpose of preparing a suitably  
conditioned surface thereon prior to, for example, electro-  
plating.

In British patent specification No. 758,013 there is de-  
scribed and claimed inter alia a method of surface treat-  
ment of titanium or titanium base alloy articles which  
comprises treatment of the surface of the said articles with  
concentrated hydrochloric acid solution at elevated tem-  
peratures followed by electrodeposition of a coating of  
metal thereon.

Said temperature may be 90-100° C. and the article  
may be pretreated with a standard pickling and de-scaling  
bath before treatment with the hydrochloric acid.

It has now been found that by treating the surfaces of  
titanium or titanium base alloy articles with hydrogen at  
elevated temperatures surfaces are formed which have a  
substantially similar etched appearance to that produced  
according to the method described and claimed in British  
patent specification No. 758,013, that is to say surfaces  
which are porous, grey and matt in appearance. It has  
also been found that the surfaces thus formed likewise  
permit deposition thereon of a satisfactorily adherent  
coating of metal.

According to the present invention the method of  
surface treatment of titanium or titanium base alloy  
articles comprises treatment of the surface of the said  
articles with hydrogen at elevated temperatures, prefer-  
ably at a temperature between 600° and 1000° C.,  
followed by deposition of a coating of a metal thereon,  
for example platinum, rhodium or iridium or an alloy of  
two or more of these metals.

It is sometimes desirable to pretreat the articles with  
a pickling or de-scaling bath before treating them with  
hydrogen.

By way of example, by passing hydrogen over 16 pieces  
of titanium 1½ in. x ¾ in. x 16 S.W.G. (0.064 in.) at a  
temperature between 600 and 1000° C. for various periods  
of time a series of 16 surface treated titanium specimens

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is prepared containing hydrogen over a range of 9-95 mg.  
and it is found that a satisfactory adherent electrodeposit  
of platinum can be formed on each piece thus treated.  
A suitable plating procedure comprises plating at a cur-  
rent density of about 0.8 amp./sq. dm. from an aqueous  
solution of sodium hexahydroxy platinate containing 0.5  
to 1% sodium hydroxide. A complete disclosure of suit-  
able plating procedures and baths may be found in "Metal  
Industry," vol. 85 (November 19, 1954), pages 427-429.

The process of the present invention permits surfaces  
of titanium or titanium base alloy articles to be condi-  
tioned quickly, without loss of titanium, and uniformly  
even in the presence of stresses and welds.

What we claim is:

1. A method of surface treatment of an article selected  
from the group consisting of titanium and titanium base  
alloy articles which comprises treating the surface of the  
said articles with hydrogen at elevated temperatures and  
then depositing a coating of a metal thereon.

2. A method as claimed in claim 1 wherein the elevated  
temperature is between 600° and 1000° C.

3. A method as claimed in claim 1 wherein the article  
is pretreated with a pickling bath before treating it with  
hydrogen.

4. A method as claimed in claim 1 wherein the afore-  
said metal is a metal selected from the group consisting  
of platinum, rhodium and iridium and alloys of at least  
two of these metals.

5. A method as claimed in claim 1 wherein the article  
is pretreated with a de-scaling bath before treating it with  
hydrogen.

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